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AUTHOR Peck, Hugh I.
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ABSTRACT

A pilot study was conducted to determine the effects of certification status on the performance of mathematics teachers in Mississippi. A number of new teachers of mathematics in Mississippi agreed to participate in the study. The subjects included 33 regularly certified teachers who had received certification from colleges of education and 14 irregularly certified teachers who were certified from colleges of arts and sciences. Scores on three National Teachers Examination (NTE) subtests, the Mississippi Teacher Assessment Inventory (MTAISC), the Soares Teacher Self Assessment, the Soares Teacher Perceived Assessment, and the Soares Mathematics Attitude Survey (SMATH) were also used in the evaluation. Discriminant function analysis of these seven variables correctly classified 97% of the regularly certified teachers and 57.1% of irregularly certified teachers. Three variables, the NTE Mathematics Specialty Area score, the SMATH, and the MTAISC correctly predicted 91.49% of the classifications. (SLD)

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The Performance of Regularly and Irregularly Certified Teacher of Mathematics

by
Hugh I. Peck
Associate Professor

Department of Educational Psychology
Bureau of Educational Research and Evaluation
College of Education
Mississippi State University

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Teacher of Mathematics

by
Hugh I. Peck
Mississippi State University

The use of irregularly certified teachers, those certified through non-tradition routes, is a common occurrence in public schools, especially in areas of teacher shortage such as mathematics. The number of states providing alternative or irregular routes to certified is increasing. The US Department of Education, under Secretary Bennett's administration, has encouraged alternative certification opportunities. However, little is known about the impact of irregular certification routes on the performance of mathematics teachers or their students. The Bureau of Educational Research and Evaluation in the College of Education at Mississippi State University received a grant from the Southeastern Educational Improvement Laboratory (SEIL) for a Mississippi pilot study on "The Effects of Certification Status on the Performance of Mathematics Teachers". The pilot study was the third and final year of this longitudinal study; year one was a feasibility study, year two was the development of a research design plan. This presentation was developed from one phase of the overall pilot study, the phase that dealt with relationship among teacher characteristic or assessed outcomes and regular or irregular certification.

Traditional programs of teacher preparation have required training in a content area and in pedagogy Adelman (1986), AACTE (1987), Everston, Hawley & Zlotmik (1985). Emerging teacher certification practices, however, appear to be based on the assumption that content knowledge is of primary importance to teachers Patton (1985), Roth (1986), and Cornett (1983). Analysis related

to routes of entry into teaching are infrequent Hawk et al. (1985). Some who certify teachers seem to be saying that formal instruction in pedagogy is unnecessary or of minor importance AACTE (1987), Adel (1986), and Reports of the NJ Commission (1984). However, the issue, though unsettling, is far from settled AACTE (1985). The AACTE (1987) researchers have carefully reviewed the certification policy of all 50 states. Adelman (1986) writing for the Policy Studies Associates reviewed 20 programs of alternate routes to teacher certification. The AACTE Researchers refer to these as "irregular" certification procedures. The author found only one study, Hawk et al. (1985), that looked at the relationship of certification to teachers or student performance. No study was found that tried to relate teacher characteristics to route of entry in teaching.

The changing world of teacher certification is not adequately anchored to a research base. These research efforts can add one piece to the puzzle concerning irregular routes to teacher certification by examining the relationships among teacher characteristics and assessed outcomes to regular and irregular certification.

From among the 123 teachers new to teachihg mathematics in Mississippi in the fall of 1985 and 1986, 52 teachers and their students volunteered to participate in the study with approval of their superintendent and principal. Participants were paid a small stipend in return for providing data needed for the study. In addition to the information provided by the teachers and their students, scores these teachers made on their certification examination and on their "merit-raise" assessment were made available through the cooperation of the Mississippi State Department of Education and the University of Southern Mississippi.

Regularly certified teachers (N=33) were identified as those receiving certification for the normal college of education program. Irregularly certified teachers (N=14) were those certified from colleges of arts and science, those who added mathematics to an existing certification, and those teaching on emergency certification. Five participating teachers' data files were not complete enough for inclusion in this phase of the study.

Instruments selected for inclusion in this phase of the pilot study were chosen from among the entire instrument package as those that assessed characteristics and outcome measures that could distinguish between regularly and irregularly certified teachers. Since the National Teacher Examinations (NTE) are required for certification in Mississippi, both the Core and the Specialty Area, they were included for analyses. These subscales were selected for inclusion in this phase of the study; NTE General Knowledge, NTE Professional Knowledge and the NTE Mathematics Specialty Area. During 1985-86 all teachers in Mississippi were evaluated using the Mississippi Teacher Assessment Inventory as a part of the State's teacher merit raise therefore those results were available. Three of the attitude surveys developed by Soares and Soares were among the instruments selected for use in the pilot and were selected for use in this phase. The Soares Teacher Self Assessment (SCT) is a measure of the teacher evaluation of herself/himself as a mathematics teacher. The Soares Teacher Perceived Assessment (RSpro) assesses the teacher as he/she sees himself/herself valued by peers. The Soares Mathematics Attitude Survey (SMATH) measures the teacher's attitude toward mathematics.

To determine what relationship exists among various routes of entry into mathematics teaching and related teachers characteristics and selected teachers outcomes, discriminant function analysis was selected as an

appropriate statistical techniques. This technique allows one to distinguish between the regularly certified teacher and the irregularly certified teacher based on values of particular variables. Once we have identified variables which discriminate between the two groups, group membership in the actual and the predicted groups are determined to provide a degree of accuracy for the analysis. Variables are sequentially entered into the analyses until the F levels (as values of the contribution a variable makes to group membership) are no longer significant. Discriminant analyses are then computed on those variable and actual and predicted group membership are compared.

Seven variables were used in the initial discriminant analysis:

(1) NTE General Knowledge (NTE SC2),

(2) NTE Professional Knowledge (Z scores, NTE SC3),

(3) NTE Mathematics Specialty Area (NTEMSC),

(4) Mississippi Teacher Assessment Inventory (MTAISC),

(5) Soares Teacher Self Assessment (SCT),

(6) Soares Teacher Perceived Assessment (RSpro), and

(7) Soares Mathematics Attitude Survey (SMATH).

After sequentially entering three of the seven variables, (NTEMSC, MTAISC, and SMATH), the F levels were insufficient for further computations. However, the three variables used had significant values: NTEMSC, $F = 23.33$ sig $< .001$; SMATH, $F = 29.85$, sig $< .001$; MTAI, $F = 20.84$, sig $< .001$.

Table 1 presents the results of the discriminant analysis for regular and irregular certified mathematics teachers. An examination of the tables shows a Wilks Lambda of .5206 and a canonical correlation of .6924, which indicates that approximately 60% of the variance (R^2) associated with regular-irregular certification was explained by the three variables. This

analysis yielded a Chi-square of 24.808 (df=3) and was statistically significant at the .01 level of confidence or greater.

TABLE 1

Results of Discriminant Analyses Showing Differentiation of Regularly and Irregularly Certified Mathematics Teachers

Number of Variant Functions	Canonical Correlations	Wilks Lambda	df	Chi Square
3	.6924	.5206	2	24.808*

$p < .001$.

Discussion

Results of classification based on the discriminant analysis are presented in Table 2. The analysis correctly classified 97% of the regularly certified teachers and 57.1% of the irregularly certified teachers. Finally, 91.49% of the cases were correctly classified using the three variables. Our original premise was to look at the relationship among the selected variables as they relate to whether a teacher is a regularly or irregularly certified teacher. Four of the seven variables provide little discrimination between the two. Three variables shown robust discriminating power. A strong relationship exists among three variables; NTEMSC, SMATH, and MTAISC and the classification of regularly or irregularly certified teachers.

TABLE 2

Results of Classification Based on Discriminant Analysis

Membership Actual Group	#	Reg.	Predicted Group Irr.
Regular Certification	33	32	1
	97.0%	3.0%	
Irregular Certification	14	8	6
	57.1%	42.9%	

*Percent of grouped cases correctly classified = 91.49

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